Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-48   (Cancel)

49.   (New) A method for detecting atheroscelerosis suitable for in vivo evaluations comprising:

administering a first bolus of hyperpolarized 129Xe gas in vivo to a patient so that said hyperpolarized 129 Xe travels to a region of interest;

applying a first at least one excitation pulse to said first administered hyperpolarized 129Xe in the region of interest;

acquiring at least one first response signal spectrum prepresenting a response of said hyperpolarized 129 Xe to said at least one pulse via nuclear magnetic resonance spectroscopy;

identifying at least one spectral region of interest in said first response signal spectrum;

analyzing said at least one spectral region of interest in said first response signal spectrum;

determining the presence of atherosclerotic plaques based onsaid analyzing and indentifying steps;

providing a therapeutic agent to the patient to treat the atherosclerotic condition; then

administering a second bolus of hyperpolarized 129Xe gas in vivo to a patient so that

said hyperpolarized 129Xe travels to a region of interest;

applying a second at least one excitation pulse to said second administered

hyperpolarized 129Xe in the region of interest;

acquiring at least one second response signal spectrum representing the response of

said hyperpolarized 129Xe to said at least one pulse sequence via nuclear magnetic

resonance spectroscopy;

identifying at least one spectral region of interest ins aid second response signal

spectrum;

analyzing said at least one spectral region of interest in said second response signal;

and

evaluating the treatment efficacy of the therapeutic agent based on the first and

second analyzing steps.

50. (New) A method according to Claim 49, wherein said evaluating step comprises

comparing selected spectral characteristics int eh first and second response signal spectrums.

51. (New) A method according to Claim 49, wherein said second analyzing step further

comprises identifying whether the atherosclerotic condition has deteriorated or progressed

from the time of the first analyzing step.

52. (New) A method according to Claim 49, further comprising evaluating at least one of

the acquired first and second response signal spectrums to identify whether the

atherosclerosis is likely to correspond to an early stage with soft, fatty deposits, an intermediate stage with moderate calcification, or a late stage with hard mineralized or calcified deposits and/or lesions.

53.   (New) A method for detecting atherosclerosis according to claim 49, wherein the region of interest comprises at least one of the carotid arteries.

54.   (New) A method for detecting atherosclerosis according to Claim 53, wherein said at least one excitation pulse for the first and second applying steps comprises a resonant RF pulse sequence selected to produce large flip angles in said hyperpolarized 129Xe.

55.   (New) A method according to Claim 49, wherein the first applying, acquiring and analyzing steps are carried out to define a baseline physiological profile of the patient.

56.   (New) A method according to Claim49, wherein at least said first analyzing step comprises assessing whether the width of a curve associated with a peak in the response spectrum is narrower than a corresponding peak in a reference spectrum corresponding to an epidemiological study and/or an a priori baseline spectrum to determine whether the patient has atherosclerosis.